Appendix H

AIR EMISSION ESTIMATES: METHODOLOGY AND ASSUMPTIONS

INTRODUCTION

The following assumptions were used to calculate the construction air emissions for the Proposed Action in San Bernardino County. The Mojave Air Quality Management District (MDAQMD), which includes the portion of the project route in San Bernardino County, is the only affected air district that requires quantitative estimates of construction emissions.

Activities included in the calculation were: the removal of 139.4 miles of cable, 46 repeater huts, and 46 manholes; right of way rehabilitation; repeater hut site rehabilitation; and rehabilitation of 39.8 miles of the access corridor and 4.0 miles of dual track. While project activities in other counties and states would be similar to those in San Bernardino County (except concerning the access corridor), emissions estimates were not calculated for those segments because it is not required by the air pollution control agencies in those jurisdictions.

It is important to note that the assumptions enclosed herein should not be considered precise predictors of the activities associated with the Proposed Action. Rather, they are based on the general removal and rehabilitation actions as noted in the description of the Proposed Action in the Alternatives Section. It is possible that actual construction practices may vary from these assumptions, and that air emissions could vary from those calculated based on these assumptions. Spreadsheets at the back of this section show the resultant calculation of emissions based on these assumptions.

Air emissions would be generated due to the following activities, each of which is discussed in this appendix:

- construction worker vehicles - engine emissions, fugitive dust
- delivery truck vehicles - engine emissions, fugitive dust
- construction equipment - engine emissions, fugitive dust
- cable removal and right of way rehabilitation - fugitive dust
- structural removal and site rehabilitation - fugitive dust
- corridor rehabilitation - fugitive dust

In all cases, cable removal was assumed to progress 2.5 miles a day for a total of 56 days of construction. Because of the simultaneous utilization of work crews, cable right of way rehabilitation, structural removal, repeater hut site rehabilitation, and corridor rehabilitation were all assumed to be completed during the same timeframe as cable removal.

PASSENGER VEHICLE EMISSIONS

Passenger cars would generate three types of emissions: engine, paved road, and unpaved road. Removal workers were assumed to stay in nearby towns and drive their cars from the motels to the job site. An average of 30 employees was used in the calculations with two per vehicle for a total of 15 vehicles. The vehicles were assumed to be parked during the day and no extra trips were factored for personal vehicles as the workers were assumed to use construction vehicles.

The passenger cars were assumed to stay on paved roads as much as practical but were also assumed to use unpaved roads for the most direct route. The paved road emissions were calculated using the clean street emission factor. The unpaved road emissions were calculated using the farm road silt factor of 16%, a vehicle weight of 3,500 lbs, and 30 days of precipitation a year (>0.01 inch). The cars were assumed to travel no faster than 25 miles per hour on the unpaved roads.

DELIVERY TRUCK EMISSIONS

There are several items that would be transported during the proposed action: the removed cable, dismantled huts and associated equipment, and removed marker posts.

The removed cable was assumed to be transported by two different types of trucks. The chopped up cable would usually be loaded directly into 18-wheel semi tractor trailers for hauling to either Barstow, Baker, or Needles for sale or transfer to the railroad. Where the condition of the access corridor is too rough for the 18 wheel semi tractor trailers, then dump trucks were assumed necessary to haul the cable. The dismantled repeater huts were assumed to be hauled from the hut sites using dump trucks.

The 18 wheel semi trailers and dump trucks would generate three types of emissions: engine, paved road, and unpaved road. The 18 wheel semi trailers were assumed to be loaded to the maximum legal limit of 80,000 lbs. The truck and trailer were assumed to weigh 30,000 lbs leaving 50,000 lbs for the cable or 7,143 feet. The dumptrucks were assumed to be loaded with cable using a 50% packing factor to account for space between each piece of cable. A 10 cubic yard dumptruck was estimated to haul 1,856 feet of cable chopped into 4 foot lengths. Based on a preliminary review of the access corridor condition, 85 percent of the cable was assumed to be loaded directly onto 18 wheel semi trailers with the remaining 15 percent assumed to be hauled by dump trucks. Each dump truck was assumed to carry the material from 2 repeater huts.

The unpaved road emissions of the 18 wheel trailers were calculated using the farm road silt factor of 16%, a vehicle weight of 80,000 lbs, and 30 days of precipitation a year (>0.01 inch). The unpaved road emissions of the dump trucks were calculated using the farm road silt factor of 16%, a vehicle weight of 40,000 lbs, and 30 days of precipitation a year (>0.01 inch) The 18 wheel trailers and the dumptrucks were assumed to travel no faster than 25 miles per hour on the unpaved roads. The 18 wheel semi trailers and dump truck paved road emissions were calculated using the local street emission factor.

It is currently proposed to use onsite soil and gravel at the repeater hut and manhole locations to fill in the hut and manhole vaults. Off-site fill material would only be hauled to the vault locations if onsite materials are insufficient. Thus, no additional hauling emissions estimates were made for the hauling of fill material.

CONSTRUCTION EQUIPMENT EMISSIONS

Construction equipment would generate two types of emissions: engine and unpaved road. The following equipment was assumed to be used by each construction crew. Actual equipment would be determined by the construction contractor.

Supervisor Crew
15 Suburban-type trucks

Plow Crew
1-CAT D8 Dozer, 400 hp, diesel (plow)
1-CAT D7 Dozer, 230 hp, diesel (pre-rip)
1-CAT 436 Backhoe/loader, 87 hp, diesel

Trench Crew
2-CAT 436 Backhoe/loaders, 87 hp, diesel
1-Compactor

Cable Chop Crew
1-CAT 980 Loader, 300 hp, diesel
1-hydraulic cable cutter, 100 hp, diesel
1-dump truck
1-semi tractor trailer (emissions calculated in Section 3 above)

Structural Removal Crew
2-CAT 436 Backhoe/loader, 87 hp, diesel
1-Concrete Cutter Saw
1-dump truck
1-semi tractor trailer (emissions calculated in Section 3 above)

Rehabilitation Crew
1-CAT14G Motorgrader, 200 hp, diesel (grading)
1-CAT 980 Loader, 300 hp, diesel
1-dump truck
1-CAT D7 Dozer/Ripper, 230 hp, diesel (ripping)
1-Tractor/puller, 150 hp, diesel (chain-dragging)

For engine emission calculations, the equipment was assumed to operate 10 hours per day for 56 days. All of the crews except for the repeater hut removal crew were assumed to work throughout the time of cable removal. The repeater hut removal crew was assumed to work only half the cable removal time. The engine emissions for the dump trucks, and suburbans were calculated based on mileage instead of hours of operation for the rest of the equipment. The dumptrucks were assumed to move 2.5 miles per day and the 15 suburban-type vehicles to move 82.5 miles per day. Emissions from delivery trucks were estimated separately, as described above.

For unpaved road emissions, the construction equipment was assumed to move at the construction progress rate of 2.5 miles per day along the right of way. The emission factor was based on a farm road silt content of 16%, 30 days of precipitation a year (>0.01 inch) and the various equipment weights and number of wheels. The construction equipment was assumed to travel no faster than 15 miles per hour on the unpaved roads except for the Suburban-type vehicles which were assumed to travel no faster than 25 MPH.

CABLE REMOVAL

Plowing Emissions

As there are no emission factors for excavation or plowing, an approximate emission factor using available factors was used. Plowing was approximated as two operations: making a pile and cut and fill. The length of cable to be removed by plowing was assumed to be 75 percent of the total, or 104.6 miles. The plowing trench was assumed to be 1.5 feet wide and 5 feet deep for calculating the volume of disturbed soil. The mean wind speed was assumed to be 12 mph, soil density to be 1.33 tons per cubic yard, and soil moisture content of 2%.

TRENCHING EMISSIONS

As there are no emission factors for excavation or trenching, an approximate emission factor using available factors was used. Trenching was approximated as two operations: making a pile and cut and fill. Trenching was assumed to be required for all the areas not assumed to be plowed, less the areas where the cable would be pulled from

conduit (0.6 miles), for a total of 34.2 miles. The trench was assumed to be 1.5 feet wide and 8 feet deep for calculating the volume of disturbed soil. The mean wind speed was assumed to be 12 mph, soil density to be 1.33 tons per cubic yard, and soil moisture content of 2%.

Pulling Emissions

The cable would be pulled from approximately 0.6 miles of conduit in San Bernardino County. This activity would disturb areas on either end of the conduit due to the excavation and backfilling of small pits at ten locations to reach the cable and conduit. Because this activity can be approximated by the same assumptions as for trenching (see above), an additional 0.6 miles was added to the trenching total to estimate pulling emissions. Pulling may also be done in some wash areas where the plow method fails. However, since this would be determined in the field, it has not been assumed that any additional pulling would be done.

Final Trench Filling and Right of Way Grading and Dragging Emissions

The trench from trenching operations generates emissions when the pile of soil beside the trench is placed back into the trench. To approximate this emission, the emission factors for pile emptying was used for the 34.2 miles of trench. The trench was assumed to be 1.5 feet wide and 8 feet deep for calculating the volume of the soil pile to be placed back into the trench. The soil density was assumed to be 1.33 tons per cubic yard.

Plowing was assumed not to create a pile of soil along side of the trench that had to be placed back. Therefore no emissions were calculated for the 104.6 miles of plowed cable.

The final grading of the right of way after both trenching and plowing was approximated as a cut and fill operation to calculate emissions.

STRUCTURAL REMOVAL AND REPEATER HUT SITE REHABILITATION EMISSIONS

In San Bernardino County, there are 46 repeater huts to be removed, and 46 repeater hut vaults and 46 manholes to be demolished. All of the repeater hut sites would be rehabilitated.

Repeater Hut/Manhole Removal

The removal of the repeater huts and demolition of the vaults would produce emissions. The emissions from demolition and removal was calculated using the demolition emission factor which is based on cubic feet of structure demolished. Each repeater hut was assumed to be 8 feet high, 6 feet wide, and 8 feet long. The vaults to be demolished are 3 feet high, 8 feet wide, and 12 feet long.

Repeater Hut Site Rehabilitation

After the repeater hut has been removed and the associated vault demolished, the repeater hut site would be rehabilitated. The entire cleared area (10,000 square feet or 0.23 acres) would be ripped and chain dragged.

Repeater hut rehabilitation emissions are based on the use of a 230 hp diesel D7 CAT to rip the cleared areas and a 150hp tractor for chain dragging. Hut rehabilitation is assumed to require a crew of 6 persons. Ripping and chain-dragging was assumed to cover 5 foot per pass and require 20 passes for the 100-foot by 100-foot area. Equipment was assumed to be trucked along unpaved roads between huts. Workers are assumed to use the same commute as cable removal crews.

ACCESS CORRIDOR REHABILITATION

In the Proposed Action, approximately 39.8 miles of the access corridor would be eliminated and rehabilitated along with 4.0 miles of dual track. The access corridor and the dual track (both assumed to be 15 feet wide) elimination segments would be ripped down to 12 inches with a ripper shank and would require two passes. Berms along the sides of the corridor or dual track would be graded into the corridor bed. The corridor would then be chain-dragged.

Corridor rehabilitation emissions are based on the use of a 230 hp diesel D7 CAT to rip the corridor, a 200 hp CAT14G motorgrader for grading, and a 150hp tractor for chain dragging. Corridor rehabilitation is assumed to require 6 workers, who are assumed to be based in Barstow. Three trucks would be required to carry equipment from Baker to the access corridor rehabilitation segments and between segments. Four passes are assumed to be required: two for ripping, one for grading, and one for dragging.